

REMARKS

Claims 20-22, 45-46, and 49-52 are pending and are rejected. Reconsideration and allowance of Claims 20-22, 45-46, and 49-52 are respectfully requested.

Claim Rejections under 35 USC §103

Claims 20 and 21 are rejected under 35 USC §103(a) as being unpatentable over "A Versatile Data String-Search VLSI," written by Masaki Hirata and published by IEEE in April 1988, (hereinafter referred to as Hirata) in view of U.S. Patent No. 7,225,188 to Gai et al (Gai).

Independent Claim 20

Applicant's Claim 20 recites, in part:

converging all branches of the state machine, for a given stored pattern, to a single next state when a first number of the characters are matched to the contents of a state field to all state transitions of the branches.

As indicated in Applicant's previous amendment submitted January 22, 2009, none of the applied references disclose or even mention the above-recited limitation of Claim 20.

Hirata discloses an architecture that "combines a content addressable memory (CAM) and a finite-state automaton logic (FSAL) to compare the input data strings with the stored data strings,"¹ and teaches that "the data string length can be extended continuously by connecting adjacent eight CAM words [so that if] all the CAM words are connected in series, 512-word-length data can be stored as one string."²

The Examiner opines that Hirata discloses "converging all branches of the state machine (i.e., 512 word-length data can be stored as one string) for a given stored pattern (i.e., stored reference data) to a single next state (i.e., single input data)."

1 Hirata, pg. 329, col. 2, lines 3-6.

2 Hirata, pg. 330, col. 1, lines 9-13.

Thus, it seems that the Examiner is equating Hirata's teaching of connecting multiple rows of a CAM device together to store longer data strings with Applicant's recitation of "converging all branches of the state machine, for a given stored pattern, to a single next state when a first number of the characters are matched to the contents of a state field to all state transitions of the branches."

However, there is no language in Hirata that discloses a relationship between connecting CAM rows together and converging the states of the state machine. Indeed, because Hirata's CAM device does NOT store state information of a state machine, but rather compares an input string to a plurality stored data strings, Hirata does NOT disclose "converging all branches of the state machine," as recited in Applicant's Claim 20.

The Examiner subsequently acknowledges that Hirata does NOT teach "comparing a state of the state machine and one of the plurality of characters with contents of a state field and character field, respectively, stored in the TCAM device," which seems contrary the Examiner's previous assertion that Hirata discloses converging all branches of the state machine to a single next state when a first number of the characters are matched to the contents of a state field. Indeed, because Hirata does NOT disclose matching characters to a state field, Hirata necessarily fails to disclose converging all branches of the state machine to a single next state when a first number of the characters are matched to the contents of a state field to all state transitions of the branches, as recited in Claim 20.

Accordingly, Applicant's Claim 20 is patentable over the cited references.

Claims 21-22 and 52 depend from Claim 20 and therefore distinguish over the cited references for at least the same reasons as Claim 20.

Claim Rejections under 35 USC §103

Claims 45, 46, and 50 are rejected under 35 USC §103(a) as being unpatentable over Hirata in view of Gai and in further view of U.S. Publication No. US2004/0133565 to Hinshaw et al (Hinshaw) and U.S. Patent 5,525,982 to Cheng et al (Cheng).

Independent Claim 45

Applicant's Claim 45 recites, in part:

a first-in-first-out (FIFO) storage element for storing the plurality of characters;

a register coupled to the FIFO storage element and the TCAM; a rollback circuit coupled to the FIFO storage element; and a current prefix register.

None of the applied references disclose or teach a "rollback circuit coupled to the FIFO," as recited in Claim 45.

The Examiner acknowledges that neither Hirata nor Gai disclose a rollback circuit, states that Hinshaw discloses the rollback circuit in paragraph [0107], and then suggests that it would have been obvious to modify Hirata to include the teachings of Hinshaw. Applicant disagrees.

First, Hinshaw does NOT disclose a rollback circuit coupled to the FIFO storage element, as recited in Claim 45. The portion of Hinshaw referred to by the Examiner discloses a circuit that includes five modes: off, normal, dirty, silent, and rollback. However, there is no disclosure or teaching of a rollback circuit coupled to the FIFO storage element.

Second, because Hirata does NOT teach comparing a state of the state machine and one of the plurality of characters with contents of a state field and character field, respectively, stored in the TCAM device, as acknowledged by the Examiner, there is no reason to include a rollback circuit in Hirata. Indeed, adding a rollback circuit to Hirata's CAM device, as suggested by the Examiner, would only increase cost and complexity of Hirata's circuit.

Claims 46 and 49-51 depend from Claim 45 and therefore distinguish over the cited references for at least the same reasons as Claim 45.

Claim 50

Claim 50 further distinguishes over the cited references because Claim 50 recites "wherein the contents of the state field in the TCAM further comprise a previous result field."

The Examiner states that "Hirata and Gai and Hinshaw and Cheng disclose the apparatus wherein the contents of the state field in the TCAM further comprise a previous result field (Hirata: pg. 331, col. 2, Ins. 7-pg.332, col. 1, Ins. 21)." However, in contrast to the Examiner's statement, the portion of Hirata referred to by the Examiner does NOT disclose or teach a "previous result field," as recited in Claim 50. Indeed, the Examiner has failed to point to any language in Hirata that discloses or suggests a previous result field.

Further, because the Examiner has previously acknowledged that Hirata does NOT teach comparing a state of the state machine and one of the plurality of characters with contents of a state field and character field, respectively, stored in the TCAM device, the Examiner's suggestion that Hirata teaches the contents of the state field in the TCAM further comprise a previous result field is untenable. Indeed, because Hirata's CAM device does not include a state field, it does NOT include a state field further comprising a previous result field, as recited in Claim 50.

Accordingly, Claim 50 is patentable over the cited references.

CONCLUSION

In light of the above remarks, it is believed that Claims 20-22, 45-46, and 49-52 are allowable, and therefore a Notice of Allowance of Claims 20-22, 45-46, and 49-52 is respectfully requested. If the Examiner's next action is other than allowance as requested, the Examiner is requested to call the undersigned at (408) 236-6646.

Respectfully submitted,



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